BridgeX®BX4010 Gateway Platform IB to Ethernet/Fibre Channel User Manual

P/N:MTB4010B-PC

Rev 1.5

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BridgeX Series Gateway Platform IB to Ethernet/Fibre Channel User Manual

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Revision History

Table 1 - Revision History Table

Date	Revision	Description
Aug. 2010	1.5	New power numbers to specs in Appendix Added Weight to specs in Appendix Fixed the description of the power cord in the Package contents section.
Jan. 2010	1.4	Changed MT64102 to MT68102. Changed BX4010B to BX4010 Removed Licensing fro BXM Fixed misnaming of Fabric IT
Oct. 2009	1.3.6	Added Safety Warning for Laser Class 1.
Sept. 2009	1.3.5	Added Note “To access this document, please contact your local Mellanox representative.”
Sept. 2009	1.3.4	Added Note to section 2.4.5.2 and 2.4.5.3
Sept. 2009	1.3.3	Removed redundant section regarding Management and Software
Sept. 2009	1.3.2	Replaced references from SW UM to FabricIT-BXM
Sept. 2009	1.3.1	Updated revision table
July 2009	1.2	Implemented new template
July 2009	1.1	Verified installation kit
July 2009	1.0	Initial Release

About this Manual

This manual describes the installation and basic use of Mellanox BridgeX BX4010B Gateway products and development platforms based on the MT68102 BridgeX gateway device.

Intended Audience

This manual is intended for users and system administrators responsible for installing and setting up BridgeX gateways from InfiniBand to Ethernet, and/or Fibre Channel fabrics and networks.

The manual assumes familiarity with the InfiniBand® Architecture Specification as well as the Ethernet Architecture.

Related Documentation

Additional documentation available from Mellanox is provided in Table 2.

Table 2 - Reference Documents

BridgeX Programmer's Reference Manual *Document # 2936PM*	User guide describing the interface used by developers to write a driver between system software and the Mellanox BridgeX device.
FabricIT BX Management Software CLI User's Manual	User manual describing the software interface including examples for using the BX manager and for installing EoIB and FCoE Host stacks. www.mellanox.com > Products > Gateway Software > Software and Documentation Download. You will need a valid Mellanox Gateway S/N.
Mellanox Firmware Tools (MFT) User's Manual *Document # 2329*	The MFT (Mellanox Firmware Tools) package is a set of firmware tools. The manual supplied with this package provides an overview of the firmware its installation and replacement. The MFT can be downloaded with its documentation at: www.mellanox.com > Downloads > Firmware Tools

Conventions

The terms uplink (internal) and downlink (external) are used throughout the document. Uplink refers to the server switch facing ports, where InfiniBand (IB) is used. Downlink refers to the Local Area Network (LAN) or Storage Area Network (SAN) switch facing ports, where Fibre Channel (FC) and/or Ethernet (EN) are used.

Caution: This symbol indicates the possibility of physical injury to the user or installer.

Gateway Products Covered in this User Manual

Table 3 - Gateway Products Covered by this User's Manual

Family	Product Number	Description
BridgeX Gateways	MTB4010B-NC	BridgeX EoIB system, single controller, 2 CX4 uplink ports and 6 SFP+ downlink ports without CPU, RoHS5
	MTB4010B-PC	BridgeX EoIB single controller, 2 CX4 uplink ports and 8 SFP+ downlink ports with CPU, RoHS5

Mellanox Part Numbering Legend

Table 4 - Part Numbering Legend

Place	Field	Decoder
MT		Mellanox Technologies
B	System Type	= BridgeX based Bridge System
4	Gateway protocols	4 = VPI Uplinks
0	For future use	
1	# of BridgeX devices	1 = 1 BridgeX device 2 = 2 BridgeX device2
0		
–	Separator	
P		P = Management PC N = no management PC
R	RoHS	C=RoHS5, X=RoHS6

1 Overview

The Mellanox BridgeX BX4010B gateway series is a 1U, top-of-rack gateway that provides server I/O consolidation over an InfiniBand network. The product supports 10/20/40Gb/s InfiniBand to 1GigE/10GigE Ethernet and 1/2/4/8G Fibre Channel bridging. The device supports 1/10 Gigabit Ethernet to both 1GigE/10GigE Ethernet and 2/4/8G Fibre Channel bridging

Ethernet over InfiniBand (EoIB) and Fibre Channel over InfiniBand (FCoIB) protocols are used for I/O consolidation on a single physical InfiniBand wire.

The BridgeX Gateway is a multi-protocol bridge that enables InfiniBand connectivity to native Ethernet and/or Fibre Channel networks. The gateway implements stateless bridging protocols by encapsulating Ethernet over InfiniBand (EoIB) and Fibre Channel over InfiniBand (FCoIB) acting as a packet relay, based on read-only context. Bridging with the BX4010B requires the use of Mellanox ConnectX adapters on the server to implement server side processing of EoIB and FCoIB protocols. EoIB and FCoIB capable ConnectX adapters present standard Ethernet (Sockets) and Fibre Channel (SCSI) software interfaces to server applications providing transparent connectivity for existing Enterprise Data Center (EDC) and High Performance Computing (HPC) applications to Ethernet LAN and iSCSI or Fibre Channel SANs. ConnectX adapters also present a standard InfiniBand (Verbs) software interface to server applications for Inter Process Communication (IPC). This allows Ethernet, Fibre Channel and InfiniBand payloads to be carried over a common converged high performance 40Gbps InfiniBand fabric without any changes to existing server applications. Data on the converged fabric requiring access to Ethernet LAN and iSCSI or Fibre Channel SANs is bridged by the BX4010B gateway preserving existing LAN and SAN investments and management practices.

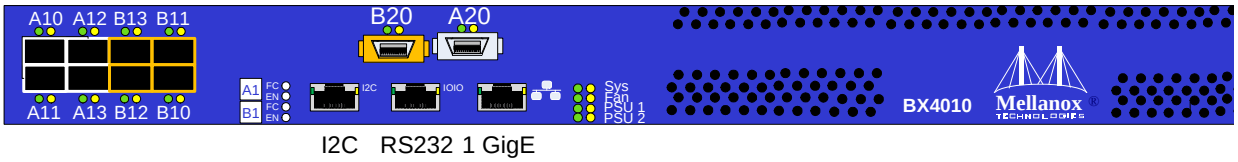
The BridgeX BX4010B gateway along with ConnectX adapters converge different networks onto a single fabric, reducing the number of adapters, cables and switch ports by a factor of three and reducing capital expenditure. The high port density of the BX4010B within a 1U form factor, low power consumption and ease of management also reduces operating expenses.

The uplink and downlink ports are separated into gateway port groups. Specific uplink ports are assigned corresponding downlink ports.

The BX4010B gateway is by default enabled only for EoIB bridging. A seperate license should be purchased from Mellanox to enable FCoIB bridging. Contact your Mellanox representative for more details.

Each gateway port group is assigned a color, in the figures in this document, to easily associate the uplink ports to the corresponding downlink ports of the gateway port group.

Figure 1: BX4010 Gateway Port Groups Distinguished by Color



I2C RS232 1 GigE

Gateway Port Group A – BridgeX controller 1 – White
Gateway Port Group B – BridgeX controller 1 – Orange

Table 5, "MTB 4010 Port Numbering"shows the uplink and downlink ports by color and alpha-numeric id identifying the port groups

Table 5 - MTB 4010 Port Numbering

Gateway Port Group by Color	BridgeX Controller Number	Uplink Ports	Corresponding Downlink FC Ports	Corresponding Downlink Ethernet Ports
White	1	A20	A10 A11 A12 A13	A10 A11 A12
Orange	1	B20	B10 B11 B12 B13	B10 B11 B12

1.1 Features

The BX4000 series has the following features:

Uplink ports

- 2 ports of 10/20/40G InfiniBand

Downlink ports

- 6 ports of 1/10 GigE or 8 ports of 2/4/8G Fibre Channel or a flexible mix of Ethernet and Fibre Channel ports
- Down link ports are configured in groups of 3 for Ethernet and in groups of 4 for Fibre Channel
- Down link ports within a group must run the same protocol (Ethernet or Fibre Channel)
- A down link port group running Ethernet must run the same speed on all ports within the group (10Gbps or 1Gbps)

1024 virtual NICs per Ethernet port

1024 virtual HBAs per FC port

Total of 8K MAC, VLAN addresses

Total of 8K WWN addresses

InfiniBand ports

- IBTA spec 1.2 compliant
- Automatic link speed negotiation
- Hardware based congestion control

Ethernet ports

- IEEE 802.3ae 10Gigabit Ethernet support
- IEEE 802.3z Gigabit Ethernet
- IEEE 802.1D Spanning Tree
- IEEE 802.1p QoS / COS
- IEEE 802.1Q VLAN Tagging
- IEEE 802.1AB Link Layer Discovery
- IEEE 802.3ad Link Aggregation with LACP
- IEEE 802.3x Flow Control (Per Priority Flow Control)
- Virtual lanes support
- Jumbo Frames up to 9K support

Connectors and Cabling

- CX4 connectors for 10/20/40Gb/s InfiniBand and 10GigE on the Uplink
- CX4 to SFP+ Hybrid Cables
- SFP+ connectors for downlink 10GigE and 2/4/8 FC ports
- Optical transceiver modules for SR and LR for Ethernet

Indicators

- Per port status LEDs; Link Activity
- System status LEDs: system, fans, power supply

Management Options

- 1 – 1000BASE-T Ethernet port

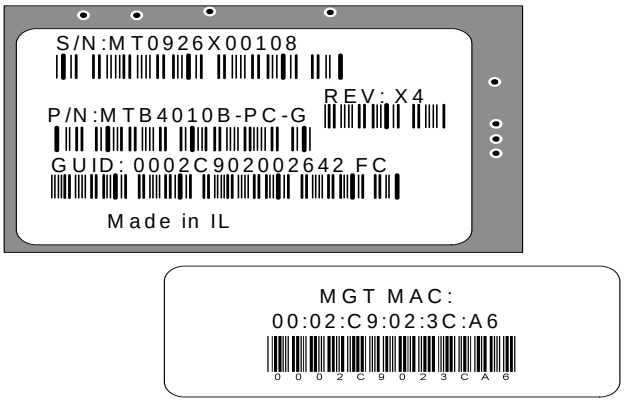
Power Supply

- Dual redundant slots
- 1 PSU is required for device functioning

1.2 Serial Number and Product Version Information

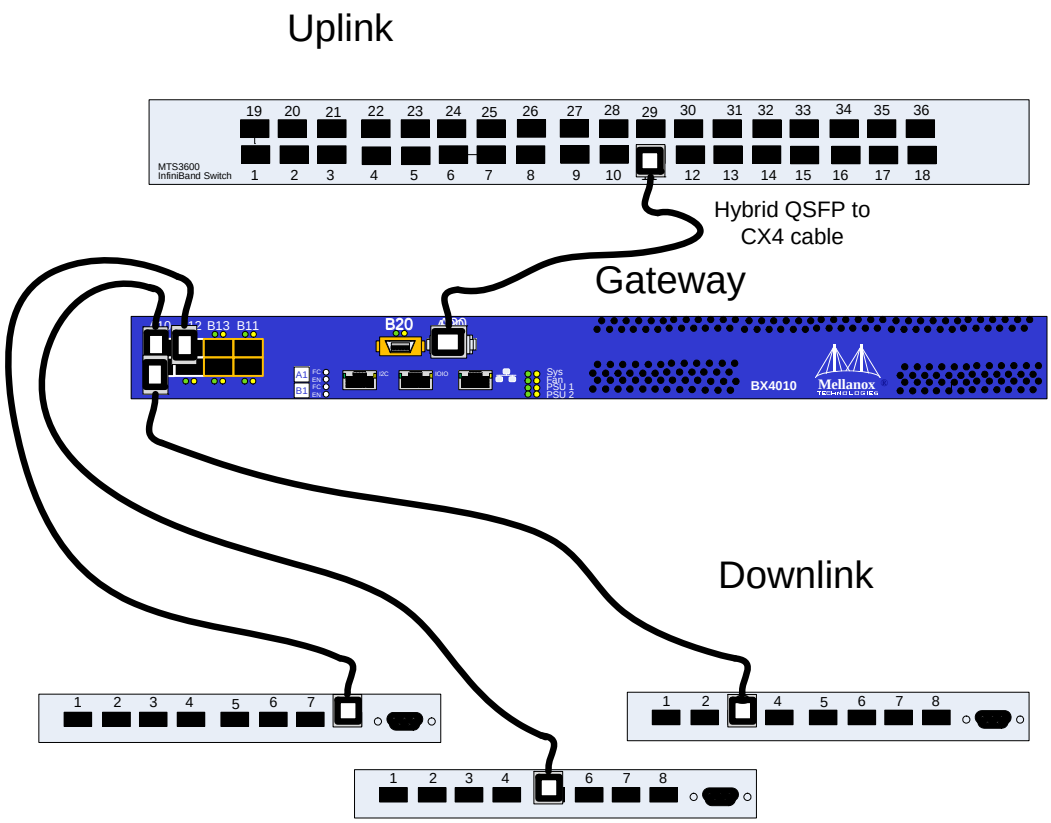
The serial number and product version information are found on the label seen in the figure below. The product version information tab location is on the power side of the gateway next to the right side PSU. See Figure 4 on page 14.

Figure 2: Generic Product Label



1.3 Gateway Port Groups

Figure 3: Example of a Setup Showing a Port Group



2 Installation and Basic Operation

2.1 Unpacking the Gateway

Before you install your new BX4010-PC, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damage that may have occurred during shipping.

If anything is damaged or missing, contact your customer representative immediately.

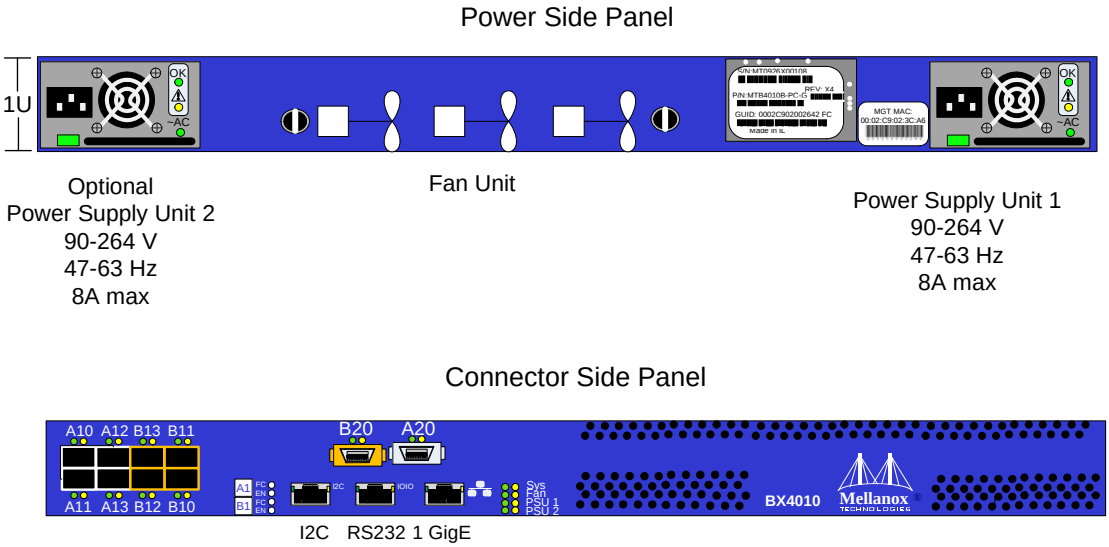
See the package contents in Section 2.3.

2.2 BridgeX Gateway Platform Hardware Overview

The figures below show dual hot-swap power supplies and the hot-swap fan module on the power side, and and various status LEDs on the connector side.

All connectivity is via the connector panel. All connectors can support active cables.

Figure 4: BX4010 Gateway System Power and Connector Panels



2.2.1 Downlink Ports

There are four downlink ports per gateway port group. These ports have SFP+ connectors that support both direct-attach copper cables and optical cables by using SR or LR modules. The gateways with single controllers have eight downlink ports while gateways with dual controllers have 16 downlink ports. The downlink ports are labelled alpha-numerically and the diagrams in this man-

ual are color coded to their corresponding uplink ports. The downlink ports within a gateway group must all have the same protocol, that is either Ethernet of Fibre Channel. Different gateway groups can have different protocols.

When configured for Ethernet, only 3 of the 4 downlink ports per gateway group are used and all downlink ports within the gateway group must have the same speed that is 1Gbps or 10Gbps. See Figure 1 on page 11 for the port numbers of the active Ethernet ports. When configured for Fibre Channel all four downlink ports per gateway group can be used and each port can independently auto-negotiate its speed to 2Gbps, 4Gbps or 8Gbps FC. To operate a port at 1Gbps FC it needs to be manually configured.

2.2.2 Uplink Ports

There is one uplink port per gateway port group. These ports have CX4 connectors. These connectors have support for powered cables and media adapter circuits. The uplink ports are labelled alpha-numerically and also the diagrams in this manual are color coded to their corresponding downlink ports.

2.2.3 Configuring the Port Gateway Groups

See the *FabricIT BXM Management Software CLI User Manual* for CLI commands to configure the gateway. You can also configure the gateway using the WebUI.

2.2.4 Making Connections to Other Formats

Hybrid CX4 to QSFP cables are supported on the uplink side. SR and LR modules can be used on the downlink side. The following downlink options are also supported.

- SFP+ modules for GigE
- SFP+ modules for 1/2/4/8G FC

2.2.5 SFP+ Transceiver Module

The gateways are shipped without optical modules. Approved Mellanox modules must be purchased from Mellanox. The OPNs for the approved Mellanox modules are MFM1T02A-SR and MFM1T02A-LR. The figure below shows the Mellanox approved SFP+ module.

SR and LR modules not recommended by Mellanox may not work with the adapter.

Figure 5: SFP+ Transceiver Module

2.2.5.1 Inserting the Optical Transceiver Module

To insert the module into the cage:

1. Open the module's locking mechanism– see Figure 6 and Figure 7.
2. Make sure that the male connectors on the module will align with the female connectors inside of the cage. Also check that there is no dirt or foreign matter in the module or in the cage.

Figure 6: Module With Locking Mechanism Closed

Figure 7: Module With Locking Mechanism Open

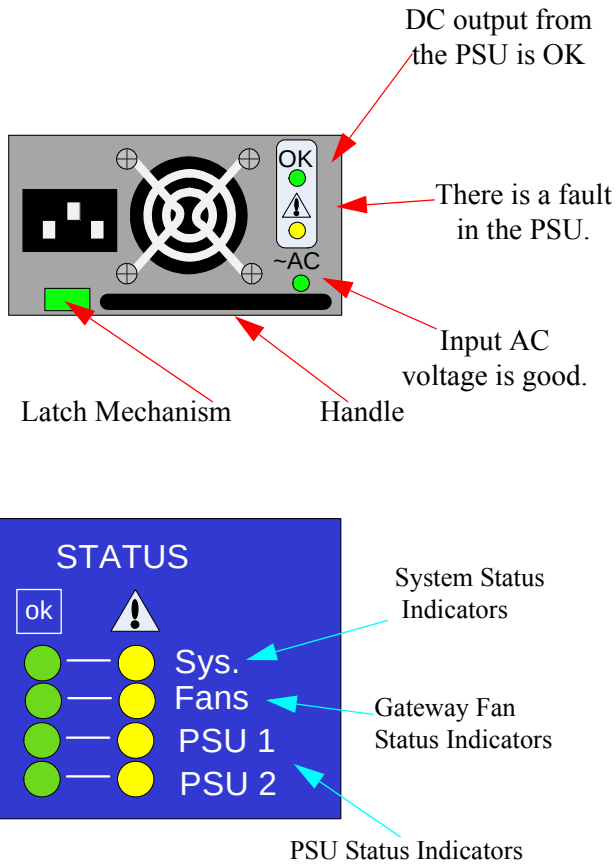
3. Insert the module into the adapter card module cage.
4. Close the locking Mechanism.

To remove the module from the cage:

1. Unlock the locking mechanism by opening the handle.
2. Pull the module out of the cage.

2.2.6 Status LEDs

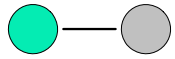
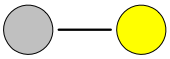
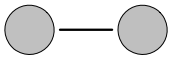
Figure 8: Power and System LEDs



2.2.6.1 System Status Indicators

The System Status Indicators are located next to the Ethernet ports. The following status conditions are possible.

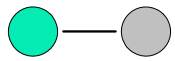
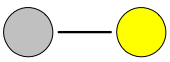
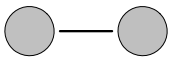
Table 6 - System Status LED Configurations

LED Configuration	Status
 Green-on off	OK – The system is up and running.
 off yellow-on	Error –The system detects a fault. Most likely the firmware did not BOOT properly. In any case, determine the problem and fix it. See Section 4, “Troubleshooting,” on page 37.
 off off	Off – The system has no power.

2.2.6.2 Fan Status Indicators

The indicators labeled “Fans” are located below the Sys LEDs. The following fan status conditions are possible:

Table 7 - Fan Status LED Configurations

LED Configuration	Status
 Green-on off	OK – All fans are operating.
 off yellow-on	Error – One or more fans is not operating. Repair or replace the fan unit. See Section 4, “Troubleshooting,” on page 37.
 off off	Off – The fan unit is not receiving any power. Check that the fan unit is properly and completely inserted.

All fans must be operating while the power supply is plugged in. Power must be removed within one minute of the fans failing, to prevent damage to the gateway.

The gateway can run on two of the three fans at an ambient temp of 45^{o} C or less.

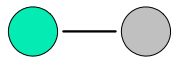
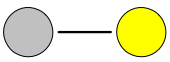
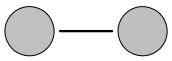
All fans must be operating while the power supply is plugged in.

If the gateway shuts down due to over temperature, unplug the gateway, wait 5 minutes and replug in the gateway. For more information See “Troubleshooting” on page 37.

2.2.6.3 PSU Status Indicators

The indicators labeled “PSU” are located below the Fan LEDs. The following PSU status conditions are possible:

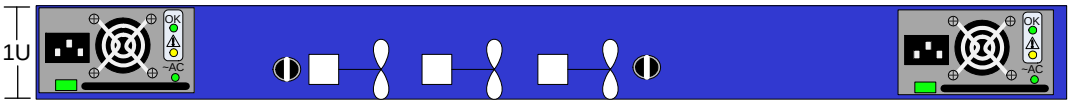
Table 8 - PSU Status LED Configurations

LED Configuration	Status
 Green-on off	OK – This power supply unit is delivering the correct DC supply.
 off yellow-on	Error – This power supply unit is NOT delivering the correct DC supply.
 off off	Off – This power supply unit is NOT receiving any input power, or this PSU is not installed.

2.2.6.4 Power Supply Status Indicators

The BX4000 series gateways are available with one or two factory installed Power Supply Units. For gateways with only one unit installed, a second Power Supply Unit can be added to increase power supply integrity through redundancy.

Figure 9: BX4000 series Power Side Panel



Optional
Power Supply Unit 2
90-264 V
47-63 Hz
8A max

Fan Unit

Power Supply Unit 1
90-264 V
47-63 Hz
8A max

The primary power supply unit (PSU1) is located on the right side of the power panel, with PSU2 on the left side. Each PSU has three status LEDs, on the right side of the PSU, that indicate the internal status of the unit.

~AC– This LED when lit indicates input voltage between 90 and 264 Volts.

⚠ –This LED when lit indicates a fault in the power supply.

OK – This LED when lit indicates that the output from the power supply is +12VDC.

2.2.7 I^2C Connector

There is an I2C connector located on the connector side panel. This connector can be used to install firmware upgrades, should the FW image be damaged and cannot be upgraded through a host PC or remotely.

This interface is for troubleshooting and debugging for FAEs and advanced users only.

2.2.8 Management Interfaces

The following interfaces allow access to the management module.

2.2.8.1 RS232 RJ45 Connector

This RS232 connection provides access for local management through connection to a host. The BX series gateways can be connected to the RJ45 connector of a computer. This connection is needed for the initial configuration of the gateway. For the initial configuration procedure for the gateway see the Installation Guide.

2.2.8.2 GigE Ethernet Connector

The gateway has one Ethernet connector. This Ethernet connection provides access for remote management. The BX series gateways can be connected to a network through the RJ45 connectors.
.

Each Ethernet port gets connected to Ethernet switches. These switches must be configured to 10/100M auto-negotiation.

2.3 Package Contents

The package should include all of the following parts:

- BridgeX Gateway
- Installation kit for 19” Rack mounting
- 1 power cable for each PSU 125V 10A 1.83M USA UL STANDARD (Type B)
- RS232 RJ45 to DB9 2meter cable
- Quick Start Guide

2.4 Gateway Platform Installation and Operation

Installation and initialization of the gateway platform are straightforward processes, requiring attention to the normal mechanical, power, and thermal precautions for rack-mounted equipment.

The gateway platform requires programming and configuration to operate as a gateway. The gateway platform includes all of the necessary functionality to operate with external standard Subnet Management software.

This section describes the installation process and basic operation of the gateway platform. Please first read the warnings sub-section carefully before carrying on with installation procedures.

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.
If the Flash memory is corrupted the Gateway may fail to boot.

Caution: The gateway platform will automatically power on when AC power is applied. There is no power switch. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

2.4.1 Installation Safety Warnings

For Safety Warnings in French see Section E,“Avertissements de sécurité d’installation (French),” on page 49, for German see Section F,“Installation - Sicherheitshinweise (German),” on page 52, and for Spanish see Section G,“Advertencias de seguridad para la instalación (Spanish),” on page 55.

1. **Installation Instructions**

Read all installation instructions before connecting the equipment to the power source.

2. **Over-temperature**

This equipment should not be operated in an area with an ambient temperature exceeding the maximum recommended: 55°C (131°F). Moreover, to guarantee proper air flow, allow at least 8cm (3 inches) of clearance around the ventilation openings.

3. **Stacking the Chassis**

The chassis should not be stacked on any other equipment. If the chassis falls, it can cause bodily injury and equipment damage.

4. **Redundant Power Supply Connection - Electrical Hazard**

This product includes a blank cover over the space for the redundant power supply. Do not operate the product if the blank cover is not securely fastened or if it is removed.

5. **During Lightning - Electrical Hazard**

During periods of lightning activity, do not work on the equipment or connect or disconnect cables.

6. **Copper InfiniBand Cable Connecting/Disconnecting**

Copper InfiniBand cables are heavy and not flexible, as such they should be carefully attached to or detached from the connectors. Refer to the cable manufacturer for special warnings and instructions.

7. Rack Mounting and Servicing

When this product is mounted or serviced in a rack, special precautions must be taken to ensure that the system remains stable. In general you should fill the rack with equipment starting from the bottom to the top.

8. Leakage >3.5mA

WARNING: High leakage current; Earth connection essential before connecting supply.

9. Add GND Connection

Before connecting this device to the power line, the protective earth terminal screws of this device must be connected to the protective earth in the building installation.

10. Installation Codes

This device must be installed according to the latest version of the country national electrical codes. For North America, equipment must be installed in accordance to the applicable requirements in the US National Electrical Code and the Canadian Electrical Code.

11. Interconnection of Units

Cables for connecting to the unit RS232 and Ethernet Interfaces must be UL certified type DP-1 or DP-2. (Note- when residing in non LPS circuit)

Overcurrent Protection: A readily accessible Listed branch circuit overcurrent protective device rated 20 A must be incorporated in the building wiring.

12. Equipment Installation

This equipment should be installed, replaced, or serviced only by trained and qualified personnel.

13. Equipment Disposal

Disposal of this equipment should be in accordance to all national laws and regulations.

14. Local and National Electrical Codes

This equipment should be installed in compliance with local and national electrical codes.

15. Hazardous Radiation Exposure

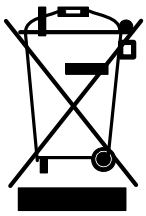
Caution – Use of controls or adjustment or performance of procedures other than those specified herein may result in hazardous radiation exposure.

CLASS 1 LASER PRODUCT and reference to the most recent laser standards:
IEC 60 825-1:1993 + A1:1997 + A2:2001 and EN 60825-1:1994+A1:1996+ A2:2001

16. UL Approved AC Power Cords

For North American power connection, select a power supply cord that is UL Listed and CSA Certified 3 - conductor, [18 AWG], terminated in a molded on plug cap rated at 125 V, [15 A], with a minimum length of 1.5m [six feet] but no longer than 4.5m.
For European connection, select a power supply cord that is internationally harmonized and marked "<HAR>", 3 - conductor, minimum 0,75 mm^2 wire, rated at 300 V, with a PVC insulated jacket. The cord must have a molded on plug cap rated 250 V, 10 A.

17. WEEE Directive



According to the WEEE Directive 2002/96/EC, all waste electrical and electronic equipment (EEE) should be collected separately and not disposed of with regular household waste.
Dispose of this product and all of its parts in a responsible and environmentally friendly way.

2.4.2 Mechanical Installation

The gateway platform can be rack mounted for installation in a standard 19” rack. Front and back are arbitrary, the rack kit can be mounted so that one side is even with the vertical rack support and the other side is recessed into the rack.

The installer should use a rack capable of supporting the mechanical and environmental characteristics of a fully populated platform.

The rack mounting holes conform to the EIA-310 standard for 19-inch racks. Take precautions to guarantee proper ventilation for air intake at the front of the chassis and exhaust at the rear in order to maintain good airflow at ambient temperature. Cable routing in particular should not impede the air exhaust from the chassis.

The gateway platform can be either front or rear mounted. The notion of “front” and “back” is arbitrary. This document uses the terms power side and connector side to reduce ambiguity.

2.4.2.1 Minimum and Maximum Rack Depth for this Gateway

This gateway can go into 19” racks whose vertical supports are between 550mm and 800mm apart.

2.4.2.2 Installing the Gateway in the Rack

Tools required and customer supplied parts

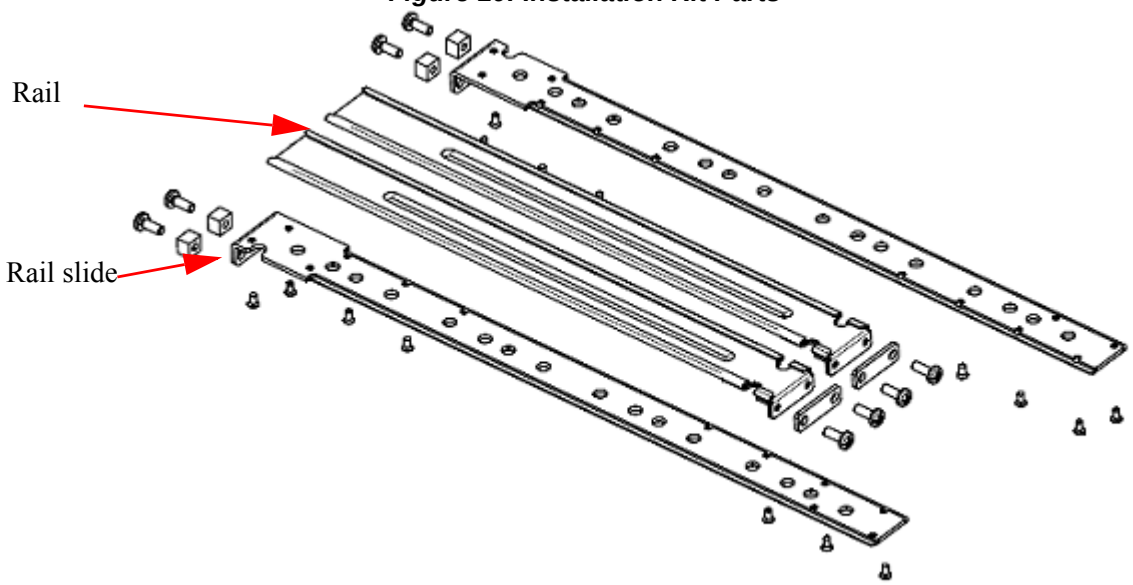
- Phillips Screwdrivers #1 and #2
- ESD Strap
- ESD mat
- Grounding screw
- Grounding wire sufficient to reach a valid ground

Table 9 - Installation Kit Parts

2 rails	1 right hand rail slide
1 left hand rail slide	16 recessed flat head screws
4 pan head screws	2 metal washers
4 sets of caged nuts and bolts for the mounting plates	

Note: There may be more screws in the kit than are required for installing the gateway.

Figure 10: Installation Kit Parts



Before you install your new gateway, unpack the system and check to make sure that all the parts have been sent, check this against the parts list. Check the parts for visible damages that may have occurred during shipping.

If anything is damaged or missing, contact your customer representative immediately.

Procedure

The following procedure can be done by one person, but inserting the gateway is much easier with two people.

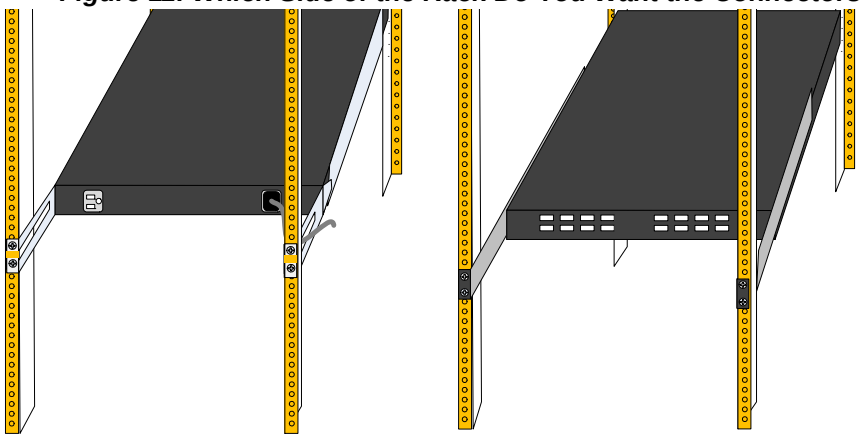
1. Place the ESD mat on the floor where you will be working and put on the ESD strap. Make sure the ESD strap is touching your skin and that the other end is connected to a verified ground.
2. Decide on Placement of the Gateway within the Rack

The gateway can be installed with either side even with the rack vertical support.

The distance between the rack and the door can be as little as 4 cm on one side of the rack and as much as 18 cm on the other side of the rack. Keep in mind that there can be as many as10 cables connected to the gateway.

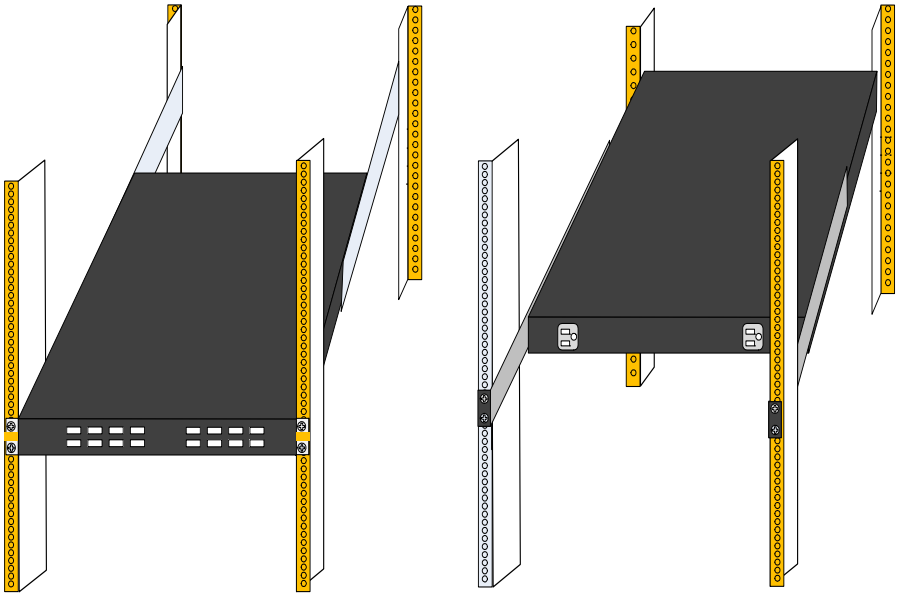
- Do you want the connector side recessed in the rack to allow for a larger cable bending radius?
- Will the connector side be recessed past other equipment in the rack and will this be problematic?

Figure 11: Which Side of the Rack Do You Want the Connectors?



The figure above shows the power side next to the door and the connector side away from the door. This configuration has more room for the cables and a larger bending radius. This configuration also allows you to put the power cord through the bracket.

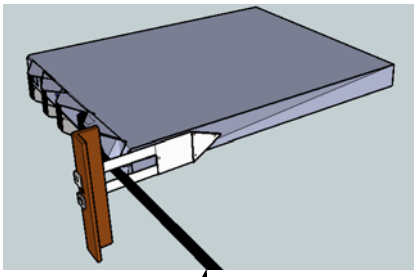
The figure below shows the connector side next to the door and the power side away from the door. This configuration may be necessary to conform to your rack configuration.



3. If you are using the second option insert the power cable before screwing the bracket to the vertical support.

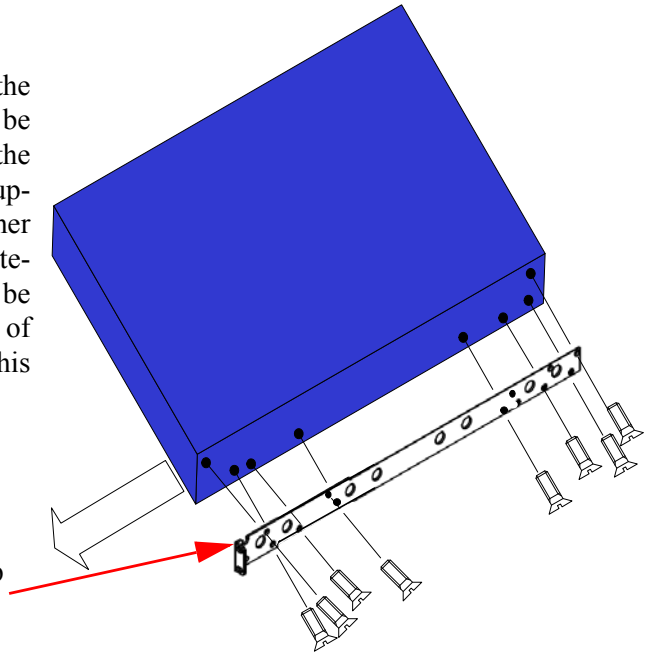
Note: If you need room to bring the power cord from the other side of the rack, recess the gateway and run the power cord through the bracket.The installation kit can be reversed so that the bracket can be installed on either side of the gateway the power side or the connector side.

Figure 12: Making Room for the Power Cord



4. Take the 2 rail slides and screw them to the gateway with the notched side up. Use eight of the flat head screws for each rail slide. You can choose from two options for mounting the rail slide; one option puts the end of the rail slide even with the end of the gateway and the second option recesses the gateway past the end of the rack. First catch all of the screws in the rail slide and then tighten all of the screws together, to 3Nm or 26.5 pound inches.

This side of the gateway will be even with the vertical rack support. The other side of the gateway will be deeper inside of the rack than this side.

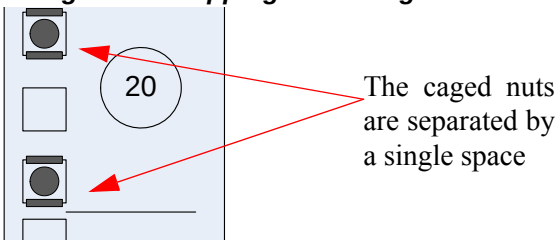


Catch the threads on all 8 screws before you attempt to tighten any of them.

Note: The rail slides are right and left handed. If you have the wrong rail slide the holes will not align properly with the holes in the gateway.

5. Clip 4 caged nuts into the holes in the rack you will be using to connect the rail slides. Check that both sides of the gateway, left and right, are the same level in the rack.

Figure 13: Clipping in the Caged Nuts



6. Using two of the pan head screws and one washer, for each rail, install the rails to the end of the rack. Place the rail behind the holes in the rack and screw the screws through the holes into the rails. Do not tighten the screws just yet.
7. Place the bolts for the caged nuts in a convenient location, so as to be easily accessible when you install the gateway into the rails.
8. Slide the gateway into the rails. This is easier with two people.
9. Make sure the gateway will be level after installation.
10. Put the gateway into place and screw the bolts into the nuts from Step 7.
11. Tighten the pan head screws to 9.2 Nm or 81.5 pound inches.
12. Ground the gateway. See Section 2.4.3 for details.
13. Plug in the power cables.

There is no On-Off switch on the gateway. The gateway will come on when one plug is plugged in.

When the gateway is plugged in, the status LED may be RED for up to three minutes until the system completes booting up.

14. Check the Status LEDs and confirm that all of the LEDs show status lights consistent with normal operation.

Warning: Any yellow status LEDs is cause for concern and must be dealt with immediately.

15. You can start connecting all of the cables to the gateway.

2.4.3 Grounding the Gateway

Make sure to connect the ground post to a valid electrical ground. Use a grounding lug and a ground wire of sufficient capacity to safely convey a potential discharge. A ground wire of AWG 6 or 4mm diameter is recommended for grounding this device. The chassis is concurrently grounded through each of the PSUs. Only connect the PSU cords to properly grounded outlets. Do not rely on the PSU grounds. It is absolutely necessary to physically ground the casing. Make sure the con-

nections are solid and permanent. If you choose to, make sure that the rack is properly grounded and that there is a valid ground connection between the chassis of the gateway and the rack. Test the ground using an Ohm meter.

2.4.4 Disassembling the Gateway from the Rack

To disassemble the gateway from the rack:

1. Put on an ESD strap and connect to a valid ground.
2. Shut down the gateway using the procedure in Section 2.4.6.
3. Unplug all power supplies.
4. Disconnect all cables.
5. Disconnect any grounds if hard wired.
6. Unscrew three of the four screws connecting the gateway brackets to the rack.

Support the gateway while you unscrew the last screw. The gateway will drop and could become damaged or it could damage other equipment in the rack.

7. While supporting the gateway unscrew the last screw.
8. Slide the gateway out of the rails. This is easier with two people.
9. Remove the rail/slides from the other side of the rack.

2.4.5 Power Connections and Initial Power On

The gateway platform ships with one Power Supply Unit. A second PSU can be ordered for redundancy. Each supply has a separate AC receptacle. The input voltage is auto-adjusting for 100-240 VAC, 50-60Hz power connections. The power cords should be standard 3-wire AC power cords including a safety ground. See Table 15, “Replacement Parts Ordering Numbers,” for ordering the cables compatible with the electrical system of your country.

Caution: The gateway platform will automatically power on when AC power is applied. There is no power switch. Check all boards, power supplies, and fan tray modules for proper insertion before plugging in a power cable.

Warning: Any yellow status LEDs is cause for concern and must be dealt with immediately.

It can take up to 2 minutes to boot up, during which time the status LED may indicate red.

Caution: After inserting a power cable and confirming the green system status LED is on; make sure that the Fan Status indicator shows green.

If the fan status indicator is not green then unplug the power connection and check that the fan module is inserted properly and that the mating connector of the fan unit is free of any dirt and/or obstacles.

Caution: When turning off the gateway, use the proper shut down procedure (see Section 2.4.6) and make sure **ALL LEDS** are off to ensure a powered down status.

Do not hot swap the power supply if your gateway has only one working power supply. You must power down the system to replace the power supply unit when there is only one working PSU in the gateway.

Figure 14: Two Power Inlets - Electric Caution Notifications

CAUTION	ACHTUNG	ATTENTION
Risk of electric shock and energy hazard. The two PSUs are independent. Disconnect all power supplies to ensure a powered down state inside of the gateway platform.	Gafahr des elektrischen Schocks. Entferrnen des Netzsteckers elnes Netzteils spannungsfrei. Um alle Einhieten spannungsfrei zu machen sind die Netzstecker aller Netzteile zu entfernen	Risque de choc et de danger e'lectriques. Le de'branchment d'une seule alimentation stabilise'e ne de'branch uniquement qu'un module "Alimentation Stabilise'e". Pour isoler completement le module en cause, Il faut de'brancher toutes les alimentations stabilise'es.

2.4.6 Shut Down Procedure

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.

If the Flash memory is corrupted the Gateway may fail to boot. Should this happen, call your Mellanox representative for assistance.

To run the gateway through a power cycle

1. Run: `(config) # reload halt`
2. Wait long enough to let the gateway halt, and verify there is no ping to it.
3. Unplug the power cord.

Should the gateway fail to boot upon reinsertion of the power cord, burn the latest FW image to the Flash memory.

2.4.7 Extracting and Inserting the Power Supply Unit

With both power supplies installed in the redundant configuration, either PSU may be extracted without bringing down the system.

Make sure that the PSU that you are NOT replacing is showing all green, for both the PSU and status indicators.

If your system does not have a redundant power supply, you must bring down the system before you replace the PSU.

2.4.7.1 To extract a PSU:

Figure 15: Power Supply Unit Extraction

1. Remove the power cord from the power supply unit.
2. Grasping the handle with your right hand, push the latch release with your thumb while pulling the handle outward. As the PSU unseats, the PSU status indicators will turn off.
3. Remove the PSU.

2.4.7.2 To insert a PSU

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

Do not attempt to insert the PSU with a power cord connected to it.

2. Insert the PSU by sliding it into the opening until a slight resistance is felt.
3. Continue pressing the PSU until it seats completely. The latch will snap into place confirming proper installation.
4. Insert the power cord into the supply connector.
5. Insert the other end of the power cord into an outlet of the correct voltage.

The green PSU indicator should light and the yellow indicator should remain off. If not, Repeat the procedure starting with Section 2.4.7.1.

2.4.8 Cable Installation

All cables can be inserted or removed with the unit powered on. To insert a cable, press the connector into the port receptacle until the connector is firmly seated. The indicator, above of each CX4 ports or above each port, will light green when the physical connection is established (that is, when the unit is powered on and a cable is plugged into the port with the other end of the connector plugged into a functioning port). After plugging in a cable, lock the connector using the latching mechanism particular to the cable vendor. When a logical connection is made the yellow light will come on. When data is being transferred the yellow light will blink.

Always install and remove cables by pushing or pulling the cable and connector in a straight line with the gateway.

To remove, disengage the locks and slowly pull the connector away from the port receptacle. Both LED indicators will turn off when the cable is unseated.

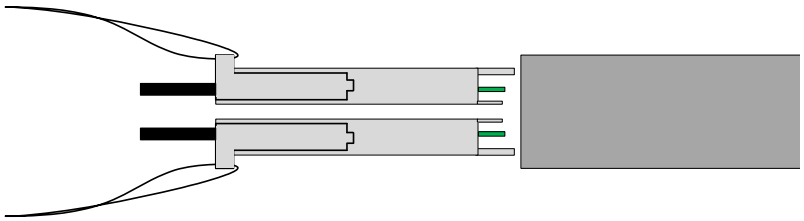
Care should be taken not to impede the air exhaust flow through the ventilation holes next to the ports. Cable lengths should be used which allow for routing horizontally around to the side of the chassis before bending upward or downward in the rack.

Cables, especially long copper cables, can weigh a substantial amount. Make sure that the weight of the cable is supported on its own and not hanging from the gateway.

These gateways are able to support direct attached copper cables, optical FC cables, and cables with media adapters at various lengths and gauges. Check www.mellanox.com => Products => Cables for cable recommendations regarding Mellanox approved cables and recommended maximum cable lengths.

Cables in the bottom row should be inserted up side down in relation to the how the cables are inserted in the top row.

Figure 16: Top and Bottom Ports



2.4.9 Extracting and Inserting the Fan Unit

Operation without a fan unit should not exceed one minute.

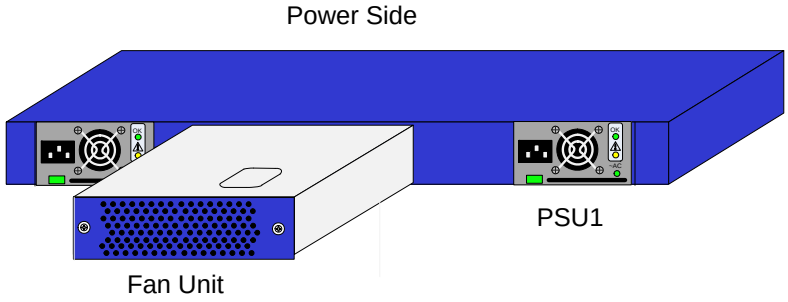
During fan hot-swap, if the LED indicators are OFF, then the fan unit is disconnected.

The hot-swap fan module provides power side to connector side air flow.

The gateway can run on three of the four fans at an ambient temperature of 45° C or less indefinitely.

To extract a Fan Unit:

Figure 17: Fan Unit Pulled Out



1. Loosen the two thumb screws locking the fan tray in place.
   One of the fan status indicators (either green or yellow) will remain on.
2. Pull the fan unit out by pulling on the thumbscrews. As the fan unseats, the fan status indicator will turn off.

To insert a FAN Unit:

1. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

2. Insert the fan unit by sliding it into the opening until slight resistance is felt. Continue pressing the fan unit until it seats completely.

The green fan status indicator should light. If not, extract the fan unit and reinsert it. After two unsuccessful attempts to install the fan unit, power off the gateway before attempting any system debug.

3. Turn the two thumb screws to lock the fan unit in place.

3 Management and Software

The BX4000 series gateway contains a management module that gives the user the ability to manage the gateway. This management module runs Mellanox proprietary software. For information regarding the software see the *FabricIT BX Management Software CLI User's Manual.*

To access this document, download the User Manual from
www.mellanox.com > Products > Gateway Software > Software and Documentation Download.
You will need a valid Mellanox Gateway S/N.

3.1 FabricIT BXM Management

FabricIT BXM is a software based management system that can be run with either a command line interface or with a GUI interface. The GUI interface can be run through the Web. The standard management module allows for managing the gateway using the Web interface or the command line interface and software supplied on the management chip.

See the *FabricIT BXM Management Software CLI User's Manual* for instructions and commands available.

4 Troubleshooting

As soon as a gateway is plugged in make sure that the green power LEDs on the PSU are on.

Power supply unit:

1. If the ~AC power LED is off, check that the power cable is plugged into a working outlet. Check that the power cable has a voltage within the range of 100 - 260 volts AC.
2. Remove and reinstall the power cable.
3. Replace the PSU.

The Status green power LED for PSU1 or PSU2 does not come on:

1. If the LED on the PSU is off, check that the Sys is off.
2. Remove and reinstall the power cable. Check that the power outlet (in the wall) is working.
3. Remove and reinstall the PSU. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.
4. Replace the PSU.

The power LED for the gateway shuts off:

1. Check that the there is adequate ventilation.
2. Make sure that there is nothing blocking the front or rear of the chassis and that the fan modules and ventilation holes are not blocked (especially dust over the holes).
3. Use the FabricIT BXM manager to check the temperature of the gateway.
4. If you find dust blocking the holes it is recommended to clean the fan unit and remove the dust from the front and rear panels of the gateway using a vacuum cleaner.

The green power LED for the fans does not come on:

1. Check that the Power LEDs are on.
2. Remove and reinstall the fan unit. Make sure the mating connector of the new unit is free of any dirt and/or obstacles.

Caution: Do not run the gateway if the System Status LED for the Fans is Red!

The link LED for the connector does not come on:

1. Check that both ends of the cable are connected.
2. Check that the locks on the ends are secured.
3. Make sure that the latest FW version is installed on both the HCA/ NIC cards and the gateway.
4. If media adapters are used, check that the all connections are good, tight, and secure.

The activity LED does not come on:

Check that the Subnet Manager has been started.

The management module does not start

1. Check that the OpenSM has been started.

Power Cycle the Gateway:

If the Gateway is powered off for any reason without using the proper shut down procedure the Flash memory may be corrupted.
If the Flash memory is corrupted the Gateway may fail to boot. If this happens talk to your Mellanox representative.

To run the gateway through a power cycle

1. Run: `(config) # reload halt`
2. Wait long enough to let the gateway halt, and verify there is no ping to it.
3. Unplug the power cord.
4. Plug in the power cord.

Gateway Fails to Boot:

1. Reburn the firmware to the Flash memory, using the MFT tools.

Appendix A: Specifications

Table 10 - MTB4010B-NC Specification Data

Physical		**Power and Environmental**	
Size:	1.74” (1U) H x 19” W x 21.26” D 44mm X 442mm X 540 mm	Input Voltage: Active Cables	100 - 240VAC 50-60Hz
Weight:	25lbs, 11.3kg	Max Power:	114.81 W
Mounting:	19” Rack mount	Typ Power:	111.58 W
SerDes Speeds	10, 20, 40 Gb/s per port		
		Passive Cables	
Connectors and Cabling:	CX4 Cable SFP+	Max Power: Typ Power:	93.39 W 90.17 W
		Temperature:	0° to 55° Celsius
Port Types:	Cx4 / SFP+	Humidity:	10% - 90% non-condensing
Protocol Support		**Regulatory Compliance**	
InfiniBand:	Auto-Negotiation of (40Gb/s, 20Gb/s, 10Gb/s)	Safety:	UL60950 C-UL to CAN/CSA 22 2 No.60950-1 TUV/GS to EN 60950-1, Amendment A1-A4, A11 CB-IEC60950-1, all country deviations
QoS:	8 InfiniBand Virtual Lanes for all ports		
Management:	Baseboard, Performance, and Device management Agents for full InfiniBand In-Band Management	EMC (Emissions):	CC 47CFR Part 15 Class A EN 55022 Class A ICES-003 Class A VCCI Class A AS/NZS CISPR 22 Class A CISPR 22 Class A EN 55024 EN 300386 CE
		Environmental:	EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test

Physical		Power and Environmental	
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance: Addressing: Bridging Capacity	Simultaneous wire-speed any port to any port 48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet 320Gb/s	Hot-Swappable: 1+1 Redundant:	Fan Module and Power Supplies Power Supplies

Table 11 - MTB4010B-PC Specification Data

Physical		Power and Environmental	
Size: Weight: Mounting: SerDes Speeds: Connectors and Cabling: Uplink: Downlink:	1.74” (1U) H x 19” W x 21.26” D 44mm X 442mm X 540 mm 25 lbs. 11.3Kg with 2 PSUs 19” Rack mount IB 10, 20, 40 Gb/s per port Ethernet 1, 10 Gb/s 2/4/8G Fibre Channel CX4 Cable SFP+ Fibre Channel	Input Voltage: Active Cables Max Power: Typ Power: Passive Cables Max Power: Typ Power: Temperature: Humidity:	100 - 240VAC 50-60Hz 114.81 W 111.58 W 93.39 W 90.17 W 0° to 55° Celsius 10% - 90% non-condensing
Protocol Support		**Regulatory Compliance**	

Physical		**Power and Environmental**	
InfiniBand: Ethernet: Fibre Channel: QoS: Management:	Auto-Negotiation of (40Gb/s, 20Gb/s, 10Gb/s) 10 Gig Ethernet 8G Fibre Channel 8 InfiniBand Virtual Lanes for all ports Management is done through a CPU Remotely	Safety: Laser Class I EMC (Emissions): Environmental:	UL60950 C-UL to CAN/CSA 22 2 No.60950-1 TUV/GS to EN 60950-1, Amendment A1-A4, A11 CB-IEC60950-1, all country deviations IEC/EN 60825-1 / IEC/EN 60825-2, CDRH- 21 CFR1040 CC 47CFR Part 15 Class A EN 55022 Class A ICES-003 Class A VCCI Class A AS/NZS CISPR 22 Class A CISPR 22 Class A EN 55024 EN 300386 CE EU: IEC 60068-2-64: Random Vibration EU: IEC 60068-2-29: Shocks, Type I / II EU: IEC 60068-2-32: Fall Test
Scalability and Performance		**Reliability, Availability and Serviceability Features**	
Switching Performance: Addressing: Bridging Capacity	Simultaneous wire-speed any port to any port 48K Unicast Addresses Max. per Subnet 16K Multicast Addresses per Subnet	Hot-Swappable: 1+1 Redundant:	Fan Module and Power Supplies Power Supplies

Appendix B: EMC Certification Statements

Table 12 lists the approved certification status per bridge in different regions of the world.

Table 12 - Bridge Certification Status

Bridge P/N	FCC Class (USA)	EN Class (Europe)	ICES Class (Canada)	VCCI (Japan)
BX4010 series	A	A	A	A

B.1 FCC Statements (USA)

B.1.1 FCC Statements (USA)

Class A Statements:

§ 15.19(a)(4)

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

§ 15.21

Statement

Warning!

Changes or modifications to this equipment not expressly approved by the party responsible for compliance (Mellanox Technologies) could void the user's authority to operate the equipment.

§15.105(a)

Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

B.1.2 EN Statements (Europe)

EN55022 Class A Statement:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

B.1.3 ICES Statements (Canada)

Class A Statement:

“This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.”.

B.1.4 VCCI Statements (Japan)

Class A Statement:

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

(Translation - "This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio interference may occur, in which case the user may be required to take corrective actions.")

Appendix C: Interface Connector Pinouts

C.1 CX4 Interface

Figure 18: CX4 Connector Pinout

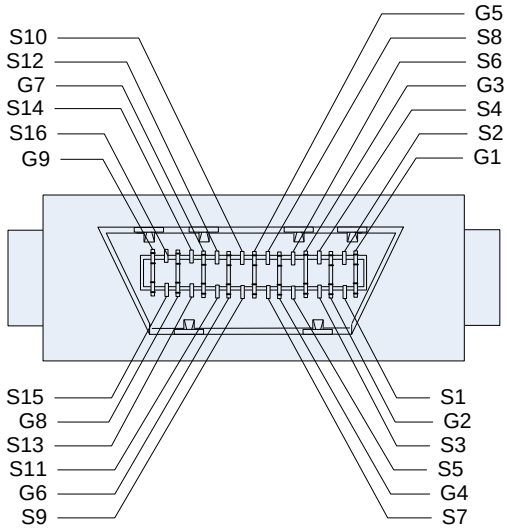


Table 13 - InfiniBand 4X Connector Pinout

Connector Pin Number	Connector Pin Name	IB Port A Signal Name	IB Port B Signal Name
S1	IBtxIp(0)	Rx_A1	Rx_B1
S2	IBtxIn(0)	Rx_A0	Rx_B0
S3	IBtxIp(1)	Rx_A3	Rx_B3
S4	IBtxIn(1)	Rx_A2	Rx_B2
S5	IBtxIp(2)	Rx_A5	Rx_B5
S6	IBtxIn(2)	Rx_A4	Rx_B4
S7	IBtxIp(3)	Rx_A7	Rx_B7
S8	IBtxIn(3)	Rx_A6	Rx_B6
S9	IBtxOn(3)	Tx_A6	Tx_B6
S10	IBtxOp(3)	Tx_A7	Tx_B7
S11	IBtxOn(2)	Tx_A4	Tx_B4
S12	IBtxOp(2)	Tx_A5	Tx_B5
S13	IBtxOn(1)	Tx_A2	Tx_B2
S14	IBtxOp(1)	Tx_A3	Tx_B3
S15	IBtxOn(0)	Tx_A0	Tx_B0
S16	IBtxOp(0)	Tx_A1	Tx_B1
G1-G6, G9, H1-H2	Signal Ground	GND	GND
G7[a]	Sense-3.3V	SENSE_P1	SENSE_P2
G8	Vcc	MC_POWER_P1	MC_POWER_P2

C.2 SFP+ Interface

Figure 19: SFP+ Connector Pinout - Rear View of Module With Pin Placement

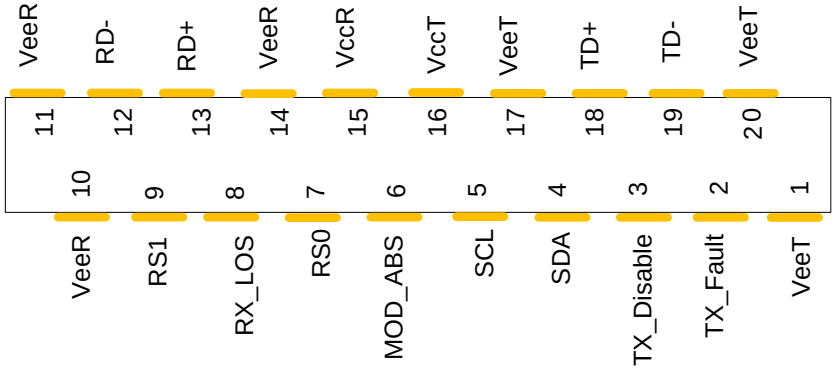


Table 14 - SFP+ Pinout

Pin	Symbol Name	Description
1	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
2	TX_Fault	Transmitter Fault.[b]
3	TX_Disable	Transmitter Disable. Laser output disabled on high or open. [c]
4	SDA	2-wire Serial Interface Data Line [d]
5	SCL	2-wire Serial Interface Clock Line [d]
6	MOD_ABS	Module Absent. Grounded within the module [d]
7	RS0	No connection required
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation. [e]
9	RS1	No connection required
10	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
11	VeeR	Receiver Ground (Common with Transmitter Ground)[a]
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver Non-inverted DATA out. AC Coupled
14	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
15	VccR	Receiver Power Supply
16	VccT	Transmitter Power Supply

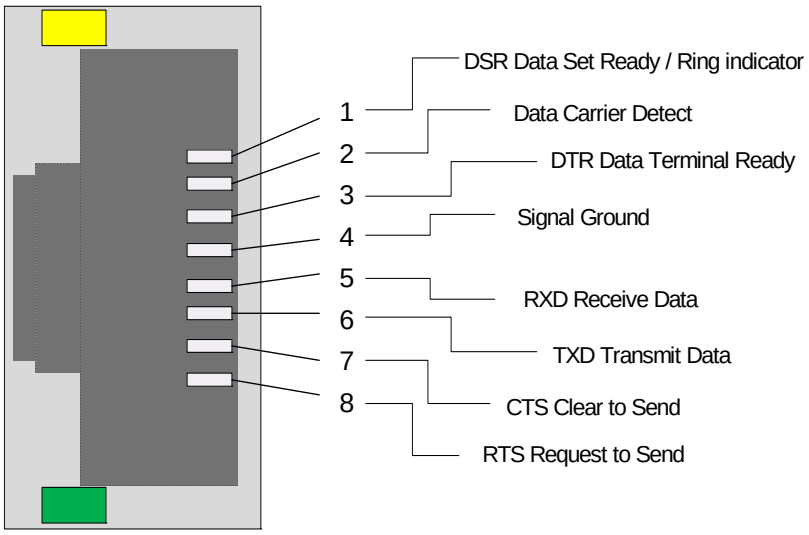
Table 14 - SFP+ Pinout

Pin	Symbol Name	Description
17	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.
19	TD-	Transmitter Inverted DATA in. AC Coupled.
20	VeeT	Transmitter Ground (Common with Receiver Ground)[a]

a. Circuit ground is internally isolated from chassis ground.
b. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
c. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V
d. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
e. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

C.3 RS232 to RJ45 Connector Interface

Figure 20: RJ45 Connector Pinout



Appendix D: Replacement Parts Ordering Numbers

Table 15 - Replacement Parts Ordering Numbers

Part Description	Product Number
Power Supply Unit PSU This Replacement part is for both the PSU 1 and PSU 2.	MTP000018
Power blank cover	MTM003600
Fan Unit	MTF 000960
Rack installation Kit	MTR003600
DB9 to RJ45 Harness for power PC management module	HAR000028
Power cord Type C13-C14 250V 15A 2M RIGHT ANGLE	ACC000242
Power cord Type B for USA, Canada, Mexico, Taiwan Type B 6ft US 125V 10A chord	ACC000204
Power cord Type B for USA, Canada, Mexico, Taiwan 125V15A 4M USA UL (Type B) RIGHT ANGLE	ACC000241
Power cord Type H for Israel	ACC000205
Power cord Type E/F for Sweden, France, Germany, Netherlands, Russia	ACC000207
Power cord Type G for UK	ACC000208
Power cord Type D for India	ACC000209
Power cord Type I for China	ACC000210
Power cord Type J for Switzerland	ACC000211
Power cord Type B for Japan	ACC000212
Power cord Type I for Australia	ACC000213

Appendix E: Avertissements de sécurité d'installation (French)

1. Instructions d'installation

Lisez toutes les instructions d'installation avant de brancher le matériel à la source d'alimentation électrique.

2. Température excessive

Ce matériel ne doit pas fonctionner dans une zone avec une température ambiante dépassant le maximum recommandé de 55°C (131°F). Un flux d'air de 200LFM à cette température ambiante maximale est nécessaire. En outre, pour garantir un bon écoulement de l'air, laissez au moins 8 cm (3 pouces) d'espace libre autour des ouvertures de ventilation.

3. Empilage du châssis

Le châssis ne doit pas être empilé sur un autre matériel. Si le châssis tombe, il peut provoquer des blessures corporelles et des dégradations de biens.

4. Connection d'Alimentation electrique excedentaire -dangers électriques

Ce produit comporte un couvercle transparent sur l'espace pour l'alimentation électrique redondante.
Ne pas faire fonctionner le produit si le couvercle transparent n'est pas solidement fixé ou s'il est enlevé.

5. Orages – dangers électriques

Pendant un orage, il ne faut pas utiliser le matériel et il ne faut pas brancher ou débrancher les câbles.

6. Branchement/débranchement des câbles InfiniBand en cuivre

Les câbles InfiniBand en cuivre sont lourds et ne sont pas flexibles, il faut donc faire très attention en les branchant et en les débranchant des connecteurs. Consultez le fabricant des câbles pour connaître les mises en garde et les instructions spéciales.

7. Montage et entretien sur baie

Lorsque ce produit est monté ou entretenu sur baie, il faut prendre des précautions spéciales pour s'assurer que le système reste stable. En général, il faut remplir la baie avec du matériel de bas en haut.

8. Fuite>3.5mA Leakage >3.5mA

« ATTENTION – La connexion à la terre des forts courants de fuite est essentielle avant le branchement de l'alimentation. »
Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

9. Forts Courants de Fuite High Leakage Current

Attention: Forts courants de fuite. Il est essentiel de relier a la terre avant de brancher l'alimentation.

10. Ajouter une information de connexion à la masse Connect a Valid Ground to this Device

Avant de brancher l'appareil à la conduite d'alimentation, les vis de protection à la terre du terminal de l'appareil doivent être appliquées à l'installation de protection à la Terre du bâtiment.

11. Installation du matériel

Ce matériel ne doit être installé, remplacé ou entretenu que par du personnel formé et qualifié.

12. Elimination du matériel

L'élimination de ce matériel doit s'effectuer dans le respect de toutes les législations et réglementations nationales en vigueur.

13. Codes électriques locaux et nationaux

Ce matériel doit être installé dans le respect des codes électriques locaux et nationaux.

14. Codes d'installation INSTALLATION CODES

L'appareil doit être installé selon l'ancienne version des codes électriques nationaux du pays. Pour l'Amérique du Nord, l'équipement doit être installé conformément aux spécifications du Code Electrique National Américain et du Code Electrique Canadien.

15. Interconnexion des unites INTERCONNECTION OF UNITS

Les câbles de branchement à l'unité RS232 et les interfaces Ethernet doivent être certifiés UL de type DP-1 ou DP-2. (Note - lorsqu'il existe dans un circuit non LPS)

Protection contre la surintensité : Un appareil de protection répertorié facilement accessible contre la surintensité du circuit de branchement et calibré à 20A doit être incorporé dans le câblage électrique du bâtiment.

16. Exposition au rayonnement grave

Mise en garde – l'utilisation de commandes ou de réglages ou l'exécution de procédures autres que ce qui est spécifié dans les présentes peut engendrer une exposition au rayonnement grave.

PRODUIT LASER DE CLASSE 1 » et références aux normes laser les plus récentes CEI 60 825-1:1993 + A1:1997 + A2:2001 et NE 60825-1:1994+A1:1996+ A2:2001

17. S'assurer que les enceintes sont appropriées

Des enceintes électriques, mécaniques et incendie adaptées doivent être fournies par le fabricant du produit final ou par l'utilisateur final.

18. Cordons électriques CA homologués UL

Pour les prises électriques en Amérique du Nord, choisissez un cordon électrique homologué UL et certifié CSA

à 3 conducteurs, [18 AWG], terminé par une fiche moulée, d'une tension nominale de 125 V, [15 A], avec une longueur minimale de 1,5 m [6 pieds] et d'une longueur maximale de 4,5 m [18 pieds]

Pour les prises électriques en Europe, choisissez un cordon électrique harmonisé internationalement et marqué "<HAR>",

à 3 conducteurs, d'un diamètre de fil minimum de 0,75 mm2, d'une tension nominale de 300 V, avec une gaine isolée en PVC. Le cordon doit avoir une fiche moulée d'une tension nominale de 250 V et d'une intensité nominale de 10 A.

Anhang F: Installation - Sicherheitshinweise (German)

1. Installationsanleitungen

Lesen Sie alle Installationsanleitungen, bevor Sie das Gerät an die Stromversorgung anschließen.

2. Übertemperatur

Dieses Gerät sollte nicht in einem Bereich mit einer Umgebungstemperatur über der maximal empfohlenen Temperatur von °C (°F) betrieben werden. Es ist ein Luftstrom von 200 LFM bei maximaler Umgebungstemperatur erforderlich. Außerdem sollten mindestens 8 cm (3 in.) Freiraum um die Belüftungsöffnungen sein, um einen einwandfreien Luftstrom zu gewährleisten.

3. Stapeln des Chassis

Das Chassis sollte nicht auf andere Geräte gestapelt werden. Wenn das Chassis herunterfällt, kann es zu Verletzungen und Beschädigungen an Geräten führen.

4. Redundanter Stromversorgungsanschluss - Elektrische Gefahr

Dieses Produkt verfügt über eine Abdeckung über dem Bereich für die redundante Stromversorgung. Betreiben Sie das Produkt nicht, wenn diese Abdeckung nicht sicher festsitzt oder entfernt wurde.

5. Bei Gewitter - Elektrische Gefahr

Arbeiten Sie während eines Gewitters und Blitzschlag nicht am Gerät, schließen Sie keine Kabel an oder ab.

6. Anschließen/Trennen von InfiniBand-Kupferkabel

InfiniBand-Kupferkabel sind schwer und nicht flexible. Deshalb müssen sie vorsichtig an die Anschlüsse angebracht bzw. davon getrennt werden. Lesen Sie die speziellen Warnungen und Anleitungen des Kabelherstellers.

7. Rack-Montage und Wartung

Wenn dieses Produkt in einem Rack montiert oder gewartet wird, sind besondere Vorsichtsmaßnahmen zu ergreifen, um die Stabilität des Systems zu gewährleisten. Im Allgemeinen sollten Sie das Gestell von unten nach oben mit Geräten füllen.

8. Geräteinstallation

Diese Gerät sollte nur von geschultem und qualifiziertem Personal installiert, ausgetauscht oder gewartet werden.

9. Geräteentsorgung

Die Entsorgung dieses Geräts sollte unter Beachtung aller nationalen Gesetze Bestimmungen erfolgen.

10. Regionale und nationale elektrische Bestimmungen

Dieses Gerät sollte unter Beachtung der regionalen und nationalen elektrischen Bestimmungen installiert werden.

11. Richtigen Schutz sicherstellen

Geeigneter elekrischer, mechanischer und Feuerschutz sind vom Hersteller des Endprodukts oder dem Endbenutzer bereitzustellen.

12. Strahlenkontakt

Achtung – Nutzung von Steuerungen oder Einstellungen oder Ausführung von Prozeduren, die hier nicht spezifiziert sind, kann zu gefährlichem Strahlenkontakt führen..

Klasse 1 Laserprodukt und Referenzen zu den aktuellsten Lasterstandards :
ICE 60 825-1:1993 + A1:1997 + A2:2001 und EN 60825-1:1994+A1:1996+ A2:2001

13. UL-und CSA Certified Netzkabel UL Listed and CSA Certified Power Supply Cord

Für Nordamerika Stromanschluss, wählen Sie ein Netzkabel, das UL-und CSA Certified
3 - Leiter, [18 AWG], mit einem angespritztem Stecker bewertet bei 125 V, [15], mit einer Mindestlänge von 1,5 m [Six Feet] aber nicht mehr als 4,5 m.
Für die europäischen Zusammenhang, wählen Sie ein Netzkabel, das international harmonisiert und der Aufschrift "<HAR>",
3 - Leiter, mindestens 0,75 mm2 Draht, bewertet mit 300 V, mit einem PVC-Mantel isoliert. Das Kabel muss eine angespritztem Stecker bewertet bei 250 V, 10 A. "

14. Ableitstrom> 3.5mA LEAKAGE >3.5mA

WARNUNG: Hohe Ableitstrom; Earth Verbindung, bevor Sie die Verbindung von wesentlicher Bedeutung werden.

15. Add GND Verbindung Informationen Add GND connection information

Bevor Sie dieses Gerät an das Stromnetz, die Schutzerde Terminal Schrauben dieses Gerät muss an den Schutzleiter in der Gebäudeinstallation.

16. INSTALLATION CODES INSTALLATION CODES

Dieses Gerät muss installiert sein, entsprechend auf die neueste Version des Landes National Electrical Code. Für Nordamerika, müssen in Übereinstimmung mit den geltenden Vorschriften in der US-amerikanischen National Electrical Code und dem Canadian Electrical Code.

17. Zusammenschaltung von EINHEITEN INTERCONNECTION OF UNITS

Kabel für den Anschluss an das Gerät RS232-und Ethernet-Schnittstellen müssen UL zertifiziert Typ DP-1 oder DP-2. (Hinweis-, wenn nicht mit Wohnsitz in LPS-Schaltung)

Überstromschutz: Eine leicht zugängliche Auflistung Abzweigleitung Überstrom-Schutzeinrichtung 20 A bewertet werden müssen in dem Gebäude Verkabelung.

Appendix G: Advertencias de seguridad para la instalación (Spanish)

1. Instrucciones de instalación

Antes de conectar el equipo a la fuente de alimentación, leer todas las instrucciones de instalación.

2. Instalación en un lugar con acceso restringido.

Esta unidad ha sido ideada para instalar en lugares de acceso restringido.

3. Sobrecalentamiento

No se debe utilizar el equipo en un área con una temperatura ambiente superior a la máxima recomendada: 45°C. Además, para garantizar una circulación de aire adecuada, se debe dejar como mínimo un espacio de 8 cm (3 pulgadas) alrededor de las aberturas de ventilación.

4. Apilamiento del chasis

Los chasis no se deben apilar sobre otros equipos. La caída del chasis podría causar lesiones corporales, así como daños al equipo.

5. Conexión de fuente de alimentación redundante: peligro de descarga eléctrica

Este producto incluye una fuente de alimentación redundante o, en su lugar, una vacía. Si se dispone de una fuente de alimentación vacía, no utilizar el producto si su tapa está quitada o no está bien cerrada.

6. Cuando hay rayos: peligro de descarga eléctrica

No utilizar el equipo ni conectar o desconectar cables durante períodos de actividad de rayos.

7. Conexión y desconexión del cable Copper InfiniBand

Dado que los cables de cobre InfiniBand son pesados y no son flexibles, su conexión a los conectores y su desconexión se deben efectuar con mucho cuidado. Para ver advertencias o instrucciones especiales, consultar al fabricante del cable.

8. Montaje y mantenimiento de bastidores

Al instalar o realizar el mantenimiento de este aparato en un bastidor, es preciso adoptar precauciones especiales para garantizar que el sistema se mantenga estable. En general, en un bastidor, los equipos se deben instalar comenzando desde abajo hacia arriba.

9. Instalación de equipos

La instalación, el reemplazo y el mantenimiento de este equipo estarán a cargo únicamente de personal capacitado y competente.

10. Asegurar confinamientos adecuados

El fabricante del producto final o el usuario final deberán suministrar un confinamiento adecuado para componentes eléctricos y mecánicos y contra incendio.

11. Eliminación de equipos

La eliminación definitiva de este equipo se debe efectuar conforme a todas las leyes y reglamentaciones nacionales.

12. Códigos eléctricos locales y nacionales

Este equipo se debe instalar conforme a los códigos eléctricos locales y nacionales.

13. Cable de alimentación homologado por UL y con certificación CSA Fuga > 3,5 mA

En conexiones de América del Norte, seleccionar un cable de alimentación homologado por UL y con certificación CSA de tres conductores, [16 AWG], terminado en un enchufe moldeado con capuchón de 125 voltios nominal, [13 A], con una longitud mínima de 1,5 metros, pero no más de 4,5 metros.

En conexiones europeas, seleccionar un cable de alimentación armonizado internacionalmente y marcado "<HAR>", de tres conductores, hilo de 1,0 mm2 como mínimo, 300 voltios nominal, con cobertura protectora aislante de PVC. El cable debe tener un enchufe moldeado con capuchón de 250 voltios nominal, 10 A.

ADVERTENCIA: Alta corriente de fuga. Es esencial efectuar la conexión a tierra antes de conectar la alimentación.

14. Añadir conexión a tierra

Antes de conectar el dispositivo a la línea de alimentación, los tornillos del terminal de la puesta a tierra de protección del dispositivo se deben conectar a la puesta a tierra de protección de la instalación del edificio.

(Información de conexión a tierra):

La instalación del edificio deberá prover un medio para la conexión con la puesta a tierra de protección y un técnico de servicio deberá conectar permanentemente el equipo a dicho medio de conexión.

Un TÉCNICO DE SERVICIO comprobará si la toma eléctrica de la que se suministrará corriente al equipo provee una conexión con la puesta a tierra de protección del edificio. De no ser así, el TÉCNICO DE SERVICIO se encargará de instalar un CONDUCTOR DE CONEXIÓN A TIERRA DE PROTECCIÓN, del terminal de puesta a tierra de protección separado al conductor de tierra de protección del edificio. El equipo se instalará en un área donde haya conexión equipotencial, como por ejemplo, un centro de telecomunicaciones o una sala de computadoras dedicada.

15. Códigos de instalación

Este dispositivo se debe instalar conforme a la versión más reciente de los códigos eléctricos nacionales del país en cuestión. En América del Norte, el equipo se debe instalar de acuerdo con las disposiciones vigentes del Código Eléctrico Nacional de los EE.UU. y del Código Eléctrico de Canadá.

16. Interconexión de unidades

Los cables para la conexión con las interfaces RS232 y Ethernet de la unidad deben estar homologados por UL tipo DP-1 o DP-2. (Nota: cuando residen en circuito no de tipo LPS)

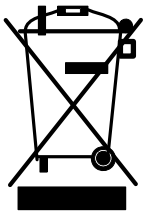
Protección contra sobrecargas: Al cableado del edificio se debe incorporar un dispositivo de protección contra sobrecargas de circuito derivado, de fácil acceso, con una corriente nominal de 20 A.

17. Exposición a niveles de radiación peligrosos

Precaución: el uso de controles o ajustes o la realización de procedimientos distintos de los que aquí se especifican podrían causar exposición a niveles de radiación peligrosos.

PRODUCTO LÁSER DE CLASE 1 y referencia a las normas de láser más recientes: IEC 60825-1:2007/03 y EN 60825-1:2007

18. Directiva sobre RAEE



Conforme a la Directiva 2002/96/CE sobre RAEE, todos los residuos de equipos eléctricos y electrónicos (EEE) se deben recolectar por separado y no se deben eliminar junto con residuos domésticos.

Al deshacerse de este producto y de todas sus partes, hágalo de una manera responsable y respetuosa con el medio ambiente.

Appendix H: SFP+ Modules

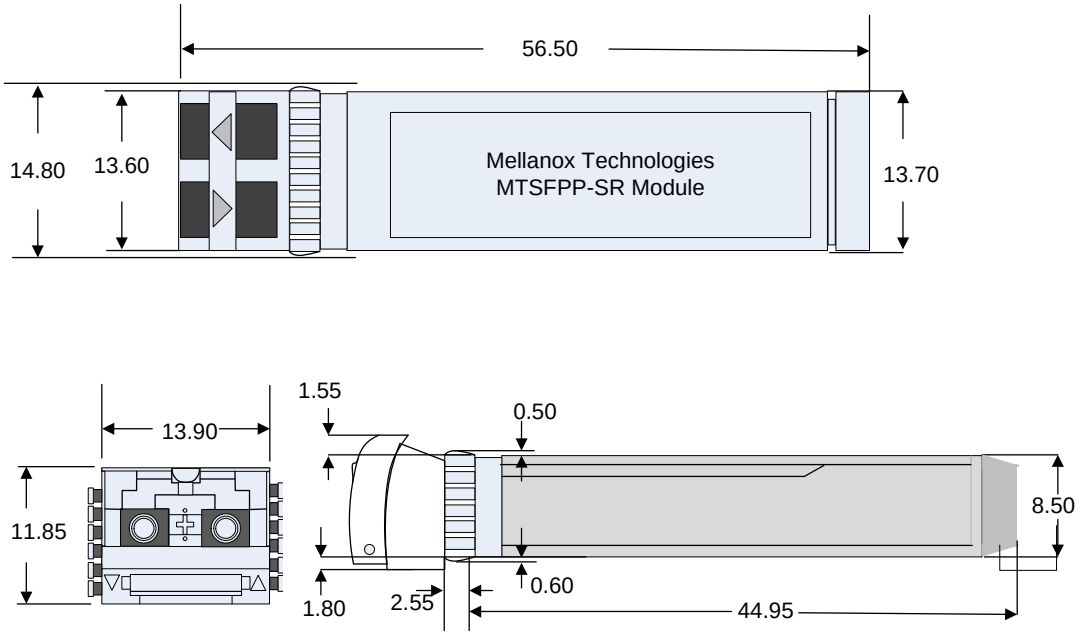
H.1 Product Features

- Hot-pluggable SFP+ footprint
- Maximum link length of 300m on 2000 MHZ-km MMF
- Supports 9.95 to 10.3 Gb/s bit rates*
- Power dissipation < 1W
- Commercial temperature range 0°C to 70°C
- Single 3.3Vpower supply
- Uncooled 850nm VCSEL laser
- Receiver limiting electrical interface
- Duplex LC connector
- Built-in digital diagnostic functions
- RoHS-6 compliant (lead-free)

H.2 Applications

- 10GBASE-SR/SW 10G Ethernet

H.3 Dimensions



H.4 Pin Descriptions

Figure 21: Rear View of Module With Pin Placement

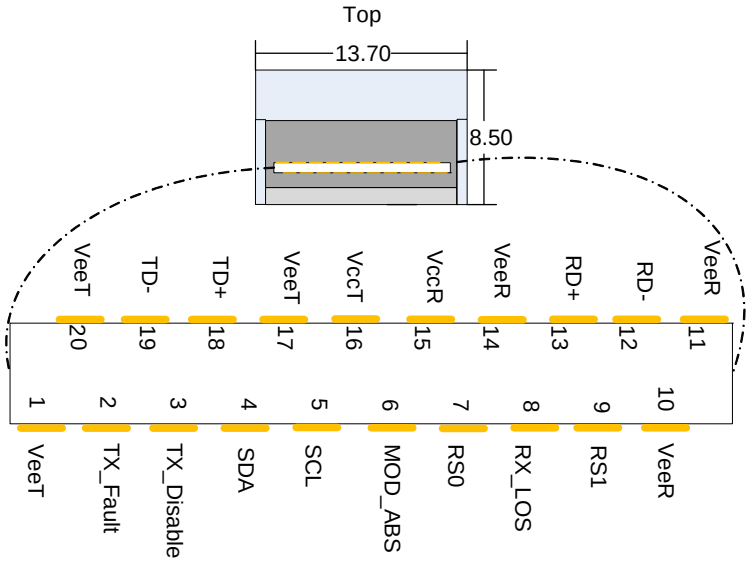


Table 16 - SFP+ Pinout

Pin	Symbol Name	Description
1	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
2	TX_Fault	Transmitter Fault.[b]
3	TX_Disable	Transmitter Disable. Laser output disabled on high or open. [c]
4	SDA	2-wire Serial Interface Data Line [d]
5	SCL	2-wire Serial Interface Clock Line [d]
6	MOD_ABS	Module Absent. Grounded within the module [d]
7	RS0	No connection required
8	RX_LOS	Loss of Signal indication. Logic 0 indicates normal operation. [e]
9	RS1	No connection required
10	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
11	VeeR	Receiver Ground (Common with Transmitter Ground)[a]

Pin	Symbol Name	Description
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver Non-inverted DATA out. AC Coupled
14	VeeR	Receiver Ground (Common with Transmitter Ground) [a]
15	VccR	Receiver Power Supply
16	VccT	Transmitter Power Supply
17	VeeT	Transmitter Ground (Common with Receiver Ground) [a]
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.
19	TD-	Transmitter Inverted DATA in. AC Coupled.
20	VeeT	Transmitter Ground (Common with Receiver Ground)[a]

a. Circuit ground is internally isolated from chassis ground.
b. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7k – 10k Ohms resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
c. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V
d. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
e. LOS is open collector output. Should be pulled up with 4.7kΩ – 10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

H.5 Power Dissipation

Max power dissipation 1.00 W